

Size-Dependent Local Structures Around Cd in CdS Nanocrystals Probed by EXAFS

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Local structures surrounding Cd atoms in CdS nanocrystals embedded in glass matrix have been investigated by using the extended x-ray absorption fine structure (EXAFS) technique. Distances between the nearest (S) neighboring shell and the central Cd atom in the nanocrystal samples were found to be appreciably shorter than that in bulk CdS. As the size of crystal decreases from bulk to ~44 and 19Å in diameter, the first-shell interatomic distance decreases from the bulk value of 2.52Å to 2.46 and 2.39Å, respectively. The bond length changes could result from the surface strain and quantum confinement effects in the nanocrystals. Information obtained from this experiment is of great importance for physical understanding of these nanoscale material systems.

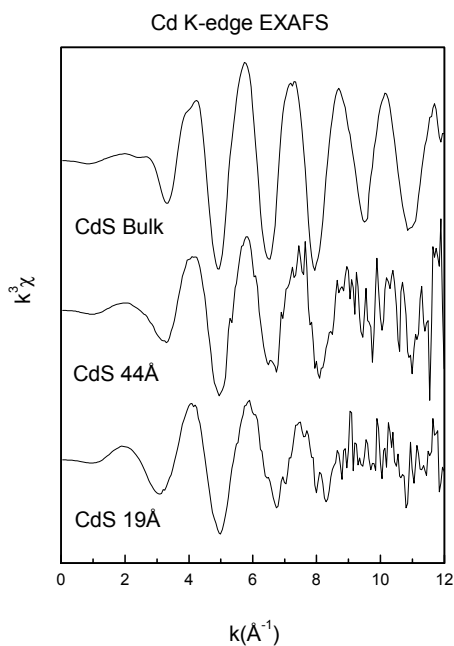


Figure1. Weighted χ functions

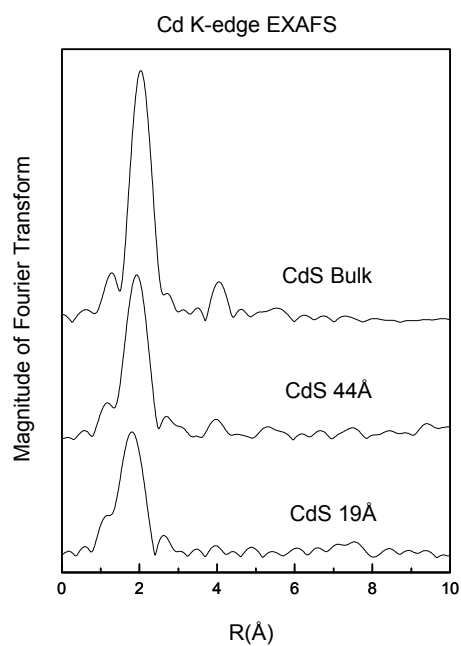


Figure2. Fourier Transform of χ functions

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